



New Technology for Weighing Cement in Silos Delivers Unprecedented Accuracy

Article

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Storage of powder cement requires highly accurate, continuous, reliable monitoring of stored quantities. Strain Systems SOLO™ is a new measurement solution announced early in 2012 that is proving itself in customer plants in the USA, Guatemala, Mexico, Canada, India, and elsewhere in the world with high accuracy in the range of 1 percent of full scale. At the same time, the technology finally resolves the age-old issue of temperature impact to readings while providing the easiest installation in its class of silo-weighing instruments.



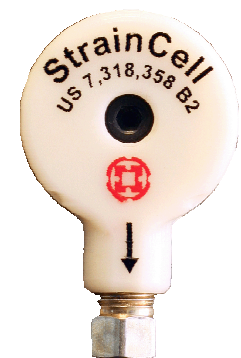
The SOLO system installed on a 90-MT-capacity powder cement silo in Mexico accurately reported the addition of less than 1 ton of powder cement. A subsequent added quantity of 23.9 tons was reported by the SOLO display as 23.8 tons.



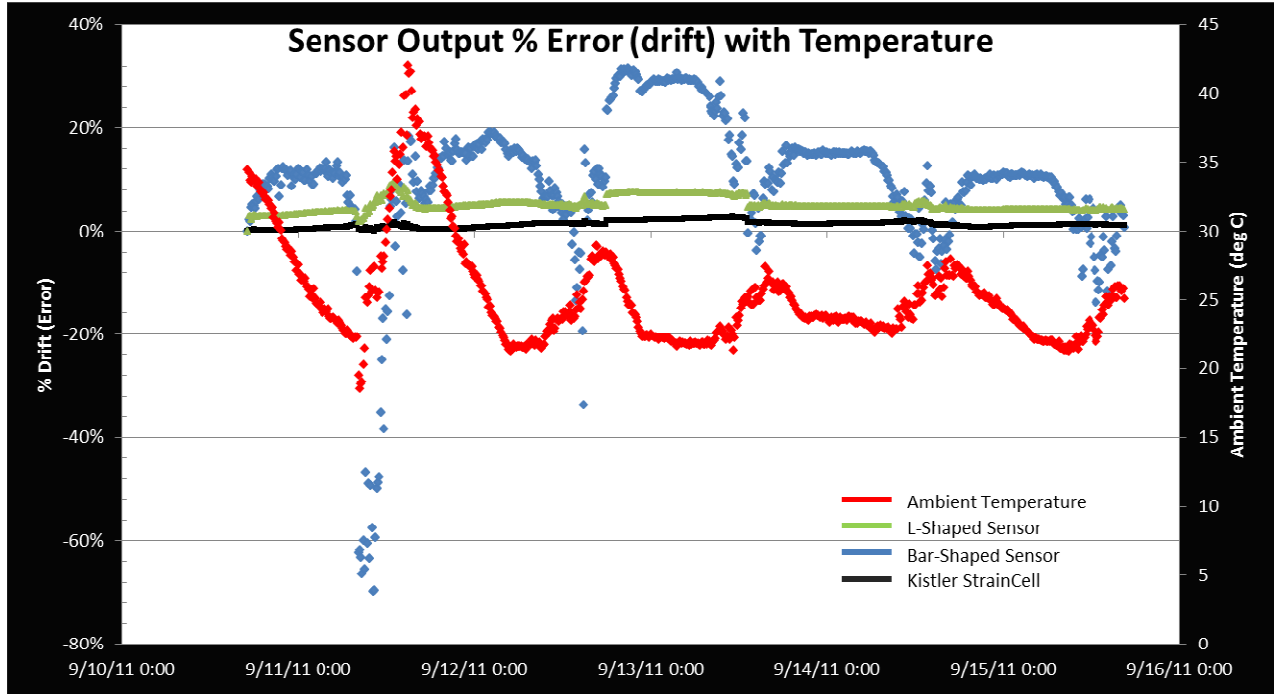
Data this accurate and reliable have been hard to come by prior to the development of the Strain Systems SOLO StrainCell™ sensor. Load cells have offered high accuracy but at a high, often prohibitive cost. Less expensive systems, using point-level devices deployed within the silos, suffered from unreliable data because of corrosion, product voids,

clumping, angles of repose, dust, or other product characteristics, and the devices themselves were soon destroyed by the abrasiveness of the powder cement. The nonintrusive SOLO StrainCell eliminates all problems related to contact with the powder cement.

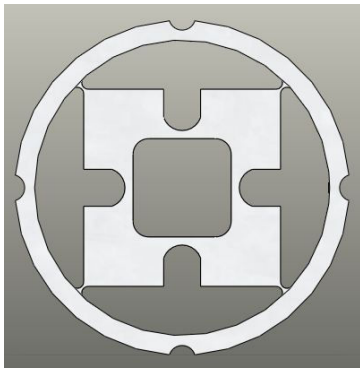
The extraordinary accuracy of the StrainCell is a by-product of the design developed by longtime instrument inventor Walter Kistler in his most recent invention. The task Mr. Kistler set for himself was to minimize or eliminate temperature effects to sensor readings, a problem that had persisted in silo storage measurement for as long as external sensors have been used. His new design – which mechanically compensates on dual axes against expansion and contraction due to thermal effects – logically called for a small, round configuration that requires only a single screw to mount. Accordingly, the resolution of the problem of signal distortions caused by environmental fluctuations resulted also in a highly accurate instrument that is quick and easy to install.



A performance comparison of the StrainCell against bar or L-shaped bolt-on sensors is illustrated in the graph. By its design, any bar or L-shaped sensor will have measurement errors similar to the graph below.



The graph indicates that any bar-shaped sensor will have up to 35 percent errors in readings. On a 100,000-lb. silo, this is equal to $\pm 35,000$ lbs. For expensive material such as cement, this error in reading may mean a significant amount in material value.



The StrainCell owes its repeatable, stable, and high-accuracy readings to its small and circular design. The sensing frame is specially designed to expand and contract with the metal to which it is attached. Since the sensor is exposed to the same environmental conditions as the structure, the sensor virtually eliminates all the measurement errors by expanding and contracting in every direction, measuring strain in every direction.

Strain Systems SOLO pairs StrainCell sensors with intelligent electronics. The system has been optimized separately for legged silos (SOLO Beam model) and for skirted silos (SOLO Skirted model). On legged silos, the weighing system offers better than 1 percent accuracy, while it achieves better than 3 percent accuracy with skirted silos.

In addition to its accuracy, SOLO offers easy installation, continuous, nonintrusive measurements and 4-20 mA, 0-10 V, RS-485, USB and Ethernet interfaces. Via its Ethernet interface, the system can send periodic emails. Strain Systems also offers an Android-based application to monitor and control the silo remotely via SOLO electronics.

Accurate Real-time Readings from Anywhere in the World

The temperature-compensation capability of the StrainCell was an industry first among externally mounted sensors, and it's not the only industry first to Strain Systems' credit.



The company has aggressively pursued Internet-enabled technologies to enhance customers' convenience in accessing inventory data at any time and from anywhere in the world. Two free downloads are the latest of these conveniences. Strain Systems SOLO™ Manager is software that enables customers to set up, configure, and communicate with their SOLO systems to manage inventories from private or public networks. SOLO Connexion™ enables customers to monitor real-time SOLO readings from Android-based smartphones; in essence, it gives the customer a silo remote control. “Our goal is to make the integration and management of our solutions seamless in customers’

processes,” said Kennan Yilmaz, President of Strain Systems.

Learn more at strainsystems.com.

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